

**VOLUNTARY CORRECTIVE ACTION WORK PLAN  
RCRA FACILITY INVESTIGATION  
NAVAL SUPPORT ACTIVITY MEMPHIS**

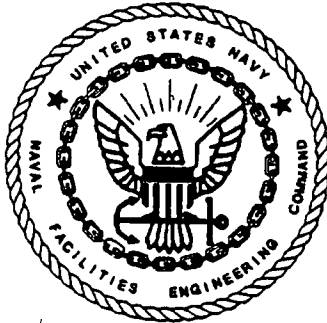
**RADAR FACILITY DISPOSAL AREA  
(SWMU 66)**

**Revision: 02**

**CTO-094  
Contract No. N62467-89-D-0318**

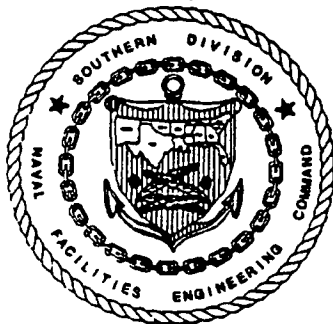
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**Prepared for:**

**Department of the Navy  
Southern Division  
Naval Facilities Engineering Command  
North Charleston, South Carolina**



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**February 27, 1996**

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## 1.0 INTRODUCTION

This Voluntary Corrective Action Work Plan outlines procedures that will be used to implement a site assessment at the Radar Facility Disposal Area (Solid Waste Management Unit [SWMU] 66) at Naval Support Activity (NSA) Memphis in Millington, Tennessee. The primary reference for this work plan is the *Comprehensive RFI Work Plan* (E/A&H, 1994). A project time-line schedule for the Voluntary Corrective Action activities is included as Appendix A.

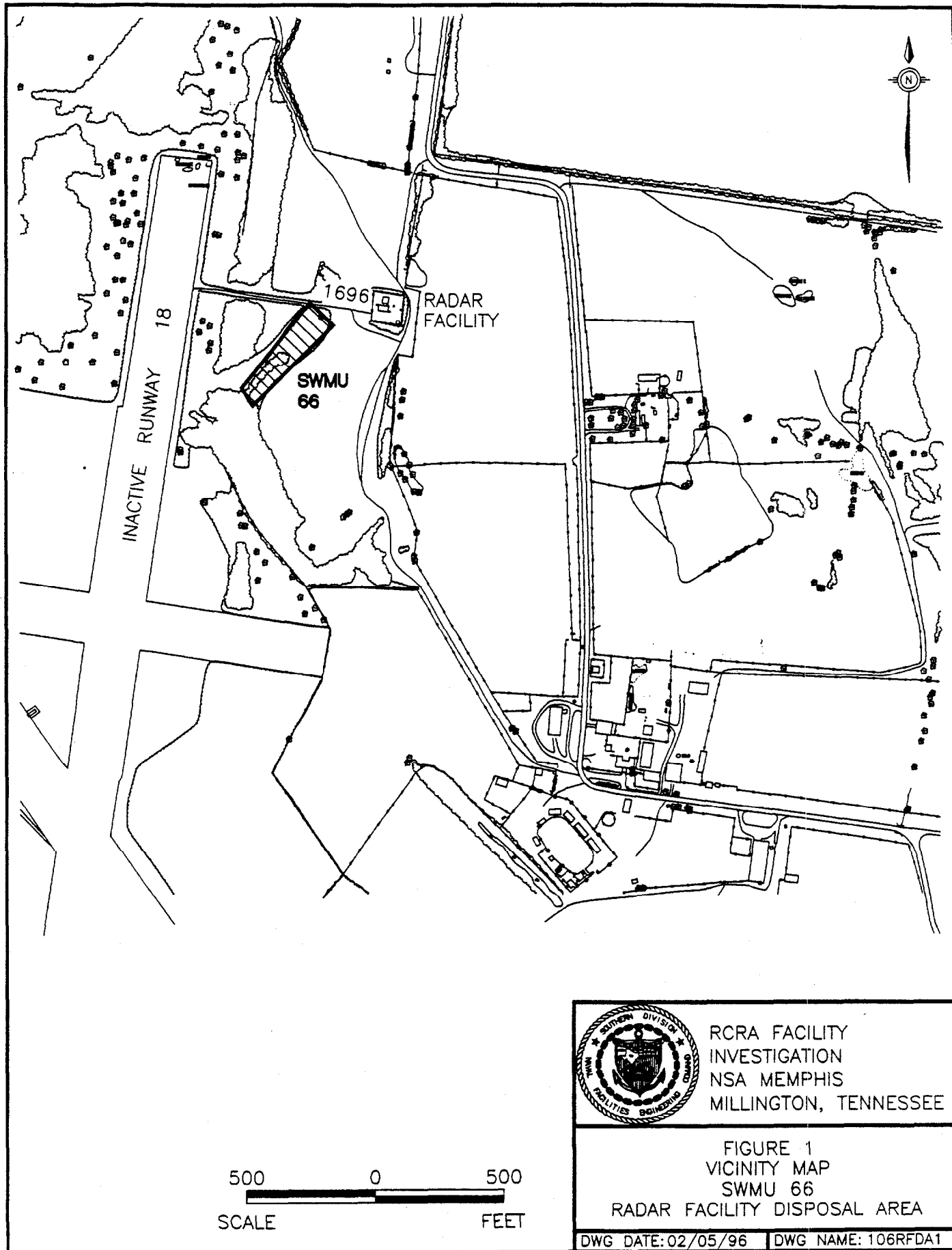
## 2.0 ENVIRONMENTAL SETTING

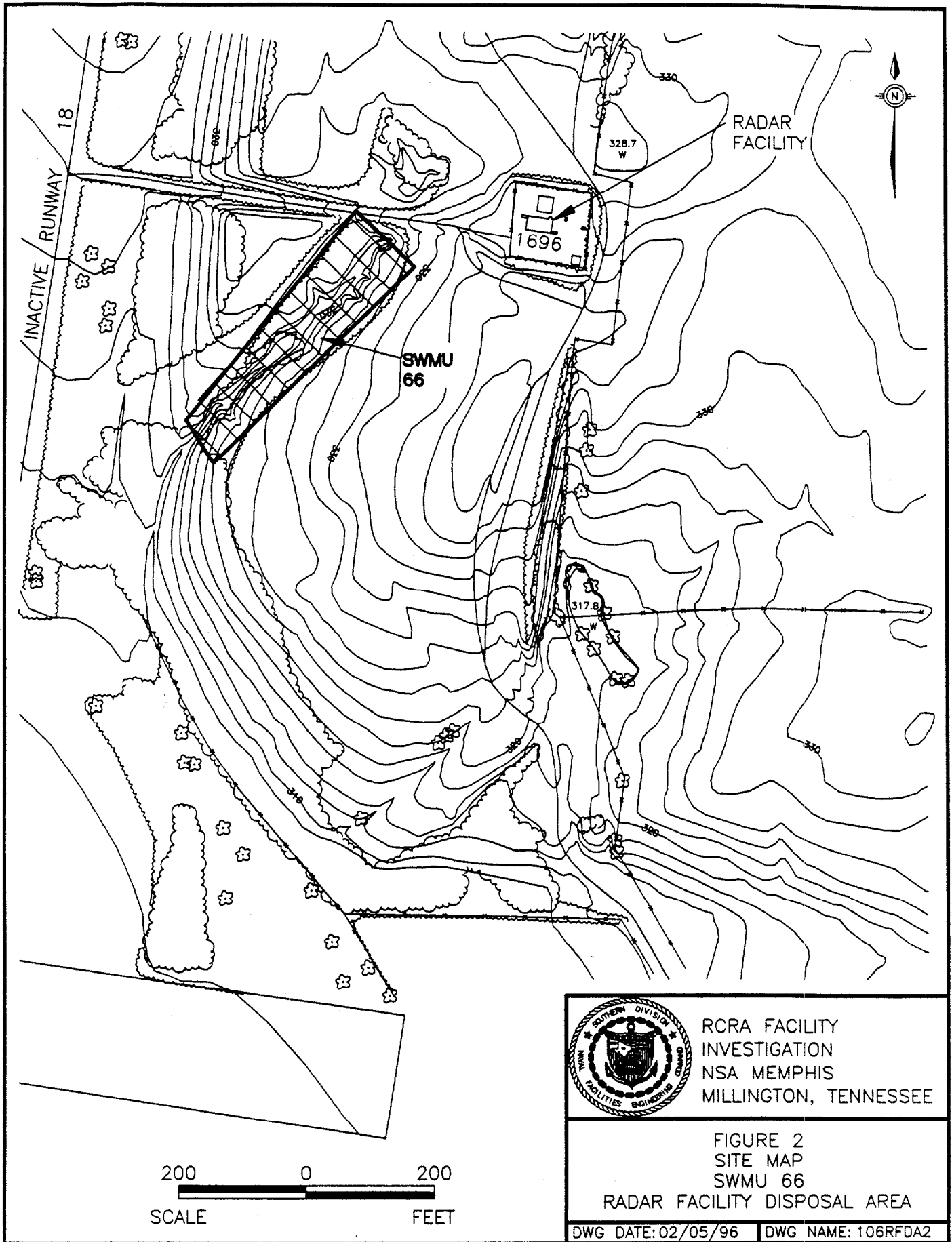
SWMU 66 is on the NSA Memphis Northside, southwest of the Radar Facility (Building 1696), and east of inactive Runway 18 (Figures 1 and 2). The area was identified in July 1994 by the Navy Construction Battalion (SeaBees) while clearing trees which were interfering with the operation of the nearby Radar Facility. The RCRA Facility Assessment (Appendix B), conducted by the Naval Facilities Engineering Command (Southern Division), states that the area was apparently used by the Morale, Welfare, and Recreation Department as a dump for scrap metal, wood, 55-gallon drums, and miscellaneous debris. The site is a heavily vegetated ravine, approximately 12 feet deep, 50 feet wide, and 350 feet long.

The area surrounding the SWMU is nonindustrial, has some topographic relief, and is covered with grass, shrubs, and trees. The ravine receives runoff from a relatively large area and channels it to the base storm sewer system, which eventually discharges to North Fork Creek (see Section 5, Potential Receptors).

## 3.0 SOURCE CHARACTERIZATION

Approximately fifty 55-gallon drums are visible on the surface in the ravine, in various positions and conditions. Most of the drums appear to be rusted and/or intentionally punctured; however, at least two were observed bulging. Markings on some of the drums have identified them as originally containing lubricating oil, refrigerants (i.e., Freon), and solvents. Some of the drums





appear to be painted consistent with barrels used as trash cans and/or for horseback barrel racing. In addition to the drums, various appliances are in the area, including stoves and refrigerators. The refrigerators may still contain refrigerants (i.e., Freon).

The period of disposal activities at this site is unknown, although a date on one drum indicates disposal may have occurred as recently as 1983.

#### **4.0 CHARACTERIZATION OF HAZARDOUS CONSTITUENT RELEASES**

##### **4.1 Previous Inspections/Investigations**

No known investigations have occurred at SWMU 66 since it was identified in July 1994. However, personnel from the Base Realignment and Closure (BRAC) Cleanup Team, Morrison Knudsen Corp. (the Navy's Remedial Action Contractor), and EnSafe/Allen & Hoshall (E/A&H) have inspected the site on several occasions since then.

##### **4.2 Field Activities**

The intent of the proposed field investigation at SWMU 66 is to determine if a release of hazardous constituents has occurred, the type of release, if any, and whether further investigation of the soil and groundwater is warranted. The staging and removal of the drums and debris will take place at a later date and is not considered in this work plan. However, if sampling indicates that additional characterization is needed, SWMU 66 will be included in the Assembly A sites, and the data collected during this investigation will be used to supplement any data collected during subsequent RFI activities.

The approach for the field investigation will be to assess the area from a health and safety perspective, identify and inventory the drums, locate/map the drums, screen and/or sample drum contents, and sample surface and subsurface soil in the area.

During the site's initial assessment, certain steps may be combined and/or performed concurrently. The drum inventory, marking/numbering, and screening portions of the investigation will be performed simultaneously. The drum contents, if any, will be sampled following the inventory phase.

#### **4.2.1 Drum Inventory, Screening, and Sampling**

The initial activity for this site assessment will consist of inventorying all drums onsite. This phase of the investigation will be performed in Level B personal protective equipment (PPE) as described in Section 8 and Appendix C. Each drum will be marked and assigned a unique inventory number (e.g., RFDA001). The location and condition of each drum will be documented through photographs (with accompanying photo log), marking/surveying the limits of the debris via Global Positioning System (GPS), stakes/flagging, and site sketches. Drums currently containing waste material will also be surveyed using GPS. Each drum will be inspected for integrity during the initial inventory. All drum location, integrity, and identification data will be recorded on a drum inventory log, as shown in Figure 3.

Air in the breathing zone within the disposal area will be monitored throughout the investigation to ensure that adequate health and safety measures are being taken. Air monitoring procedures are outlined in Section 8 of this document and Section 7 of the *Comprehensive RFI Work Plan*.

During the inventory, the inside of each drum will be screened with air-monitoring equipment for health and safety reasons and to assess its potential for releasing contaminants to the surrounding area. All screening data will be recorded on the drum inventory log.

Drums with open bungs, punctures, holes, or tears will be screened using a flame ionization detector (FID) and/or a combustible gas indicator (CGI). Instrument readings will be recorded on the drum inventory log. Unopened and/or bulging drums will be assessed and sampled only if deemed safe by the Project Health and Safety Officer. Any drums determined to be unsafe to open and/or sample will be marked and identified for removal/sampling by a remedial contractor.



NSA Memphis  
 Voluntary Corrective Action Work Plan  
 Radar Disposal Area (SWMU 66)  
 February 27, 1996  
 Revision: 02

**Figure 3**  
**Drum Log**

DRUM LOG			DATE: _____			SAMPLERS: _____	
SITE NAME: _____			LOCATION: _____			PG: _____ OF _____	
DRUM NO.	DRUM DESCRIPTION	CONTENT DESCRIPTION	FIELD CHARACTERISTICS			COMMENTS/REMARKS	TIME
			pH	FID/OVA	%LEL		

After clearance by the Project Health and Safety Officer, any drums that currently contain waste material (i.e., solid, liquid, or sludge) will be sampled and the drum location staked for subsequent documentation using the GPS system. Samples collected will be submitted to an offsite laboratory for the analyses outlined in Section 4.3. Any liquid waste samples collected will be analyzed onsite for pH. Liquid samples will be collected using a Teflon or glass (disposable) composite liquid waste sampler (coliwasa).

#### 4.2.2 Soil Sampling

Soil samples will be collected and analyzed to determine if the contents of any of the drums, current or previously, have impacted the surrounding soil. Soil samples will be collected from beneath, or adjacent to, any suspect drums having positive FID/CGI readings, that are bulging, or are in areas of soil staining. If stained soil exists, soil samples will be collected from 0 to 1 foot, and 2 to 3 feet below land surface; if no staining exists, soil samples will be collected only from 0 to 1 foot.

Soil samples will also be collected from the bed of the ravine to determine if runoff from the disposal area has impacted areas topographically downgradient. Seven samples will be collected at equally spaced intervals along the ravine floor, starting at an upgradient location and moving progressively through the ravine to downgradient locations. The sample interval for the ravine samples will be 0 to 1 foot at all locations, and 2 to 3 feet below land surface in areas where ponding may occur.

All soil samples will be collected using a decontaminated stainless-steel hand auger following procedures described in Section 4 of the *Comprehensive RFI Work Plan*.

### 4.3 Analytical Requirements

Waste samples from the drums will be submitted to an offsite laboratory for Full TCLP Analysis and reactivity, corrosivity, and ignitability. Waste samples from the drums will also be analyzed for pH and flashpoint (see Table 1). Soil samples collected from the surrounding area will be submitted for a Full Scan Analysis which includes: volatile organic compounds, semivolatile organic compounds, chlorinated pesticides/polychlorinated biphenyls, organophosphorus pesticides, herbicides, total petroleum hydrocarbons — diesel range organics, total petroleum hydrocarbons-gasoline range organics and Appendix IX metals.

**Table 1**  
**Analytical Requirements**

Sample Type	Matrix	No.	Composite /Grab	Analytical Parameters	Turn-around Time	Laboratory
Waste Characterization	Liquid/Sludge (Drum Contents)	TBD	Grab	Full TCLP Reactivity Corrosivity Ignitability	28-days	NET
Soil	Soil	7 (min.)	Grab	FSA	28-days	NET

**Notes:**

TBD — To be determined in the field  
 NET — National Environmental Testing - Cambridge Division

All analytical determinations shall meet the requirements outlined in Section 4.10 of the *Comprehensive RFI Work Plan*.

### 4.4 Sample Management

Sample management procedures will adhere to Sections 4.12 and 5 of the *Comprehensive RFI Work Plan*.

Samples collected during the SWMU 66 site assessment will be identified following the system outlined in the *Comprehensive RFI Work Plan*. Specifically, SWMU 66 samples will be assigned 10-digit sample numbers using the following format:

066-A-BBBB-CC	066	—	SWMU Number
	A	—	Matrix (soil or waste)
	B	—	Location Number (drum or station)
	C	—	Depth interval (00 if drum sample)

Example: **066S001003** is a soil sample, from SWMU 66, Location 10, 3 feet below land surface.

**066V000200** is a solid-waste sample, from SWMU 66, drum number 02.

A comprehensive list of the matrix identifications/descriptions is included as Appendix B.

#### **4.5 Sample Custody**

Sample custody will adhere to Section 4.12.5 of the *Comprehensive RFI Work Plan*.

#### **4.6 Quality Assurance/Quality Control**

Quality assurance/quality control procedures to be followed during the investigation will adhere to Sections 4.10 and 4.14 of the *Comprehensive RFI Work Plan*.

#### **4.7 Decontamination Procedures**

Sampling equipment/personnel decontamination procedures will adhere to Section 4.11 of the *Comprehensive RFI Work Plan*.

#### **4.8 Investigation-Derived Waste**

Investigation-derived waste (IDW) will be handled as specified in the *IDW Management Plan* (E/A&H, September 1995). Any liquid waste generated onsite while decontaminating equipment

or personnel will be transported to the S-775 decontamination pad and bulked in a 2,000-gallon poly tank. The tank contents will be sampled and disposed of based on the results of the sample analysis.

## **5.0 POTENTIAL RECEPTORS**

SWMU 66 is in a remote area of the NSA Memphis Northside with the nearest offsite residence approximately 1 mile to the southeast. The nearest base personnel are the employees assigned to maintain the Radar Facility 1696, which is staffed occasionally.

Surface-water drainage from SWMU 66 ultimately enters the North Fork Creek drainage system via a series of natural and man-made drainage structures. North Fork Creek is a water and food source for various animals and could expose humans through infrequent uses such as wading. Five production wells on the base supply drinking water. The nearest well to SWMU 66, NSA Memphis Production Well 1 (PW-1), is approximately 1 mile southwest of the site.

## **6.0 QUALITY ASSURANCE PLAN**

The Quality Assurance Plan presented in Section 4.14 of the *Comprehensive RFI Work Plan* will be followed throughout the site assessment at SWMU 66.

## **7.0 DATA MANAGEMENT PLAN**

The Data Management Plan presented in Section 5 of the *Comprehensive RFI Work Plan* will be followed during the site assessment for SWMU 66.

## **8.0 HEALTH AND SAFETY PLAN**

Field work at SWMU 66 will be conducted in accordance with the health and safety requirements outlined in Section 7 of the *Comprehensive RFI Work Plan*.

Before beginning investigation activities, the site will be marked with high-visibility tape, with work areas delineated as specified in the *Comprehensive RFI Work Plan*.

Assessment activities initially will be performed in Level B PPE as outlined in the Site-Specific Health and Safety Plan (Appendix C). No less than two people will enter the site, with at least one back up person remaining in the contamination-reduction zone. Air will be monitored using a FID, CGI, and radiation meter. Air-monitoring data will be recorded on the drum inventory log, as well as in the site logbook.

## 9.0 REFERENCES

- EnSafe/Allen & Hoshall. (October 1994). *Comprehensive RFI Work Plan for Naval Air Station Memphis*. E/A&H: Memphis, Tennessee.
- EnSafe/Allen & Hoshall. (September 1995). *Investigation Derived Waste (IDW) Management Plan (NSA Memphis RFI)*. E/A&H: Memphis, Tennessee.
- Morrison Knudsen Corporation. (April 1995). *Interim Corrective Measures for SWMU #66, Radar Facility Disposal Area*. Morrison Knudsen Corp.: North Charleston, South Carolina.

**Appendix A**  
**Project Timeline**

Activity ID	Description	Early Start	Early Finish	1996											
				JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	
1000	Work Plan Preparation/Submittal	12JAN96 A	07FEB96 A	▲	▽										
1010	Regulatory Review/Approval	07FEB96 A	16FEB96 A		▲▽										
1020	Field Preparation	19FEB96 A	23FEB96 A			▲▽									
1030	Field Work	26FEB96 A	01MAR96 A			▲▽									
1040	Laboratory Analysis	03MAR96 A	10APR96 A				▲								
1050	Data Review	10APR96 A	12APR96 A					▲▽							
1060	Data Validation	15APR96 A	22MAY96 A						▲						
1070	Report Preparation/Draft Report Submittal	27MAY96 A	07JUN96 A							▲▽					

PROJECT TIMELINE  
NSA MEMPHIS RFI  
VOLUNTARY CORRECTIVE ACTION  
WORK PLAN

SWMU 66  
RADAR DISPOSAL AREA



**Appendix B**

**RCRA Facility Assessment  
SWMU 66**

7.66 SWMU NO. 66: RADAR FACILITY DUMP

7.66.1 UNIT CHARACTERISTICS

7.66.1.1 TYPE OF UNIT

Inactive dump for drums, scrap metal, wood, and miscellaneous items.

7.66.1.2 DESIGN FEATURES

Based on field investigations, the dump is located in a ravine approximately 8 feet deep, and covers an area approximately 50 feet by 350 feet.

7.66.1.3 OPERATING PRACTICE (PAST AND PRESENT)

The area was apparently used, at least in part, by the Moral, Welfare, and Recreation (MWR) Department as a dump for drums, scrap metal, wood, and miscellaneous other debris. It appears that the material was tossed on the sides and down into the ravine.

7.66.1.4 PERIOD OF OPERATION

Unknown. One of the drums is labeled with a date of May 1983.

7.66.1.5 AGE OF UNIT

Unknown.

7.66.1.6 LOCATION OF UNIT

The dump is located in a ravine on the NAS North Side, southwest of Building 1696 (Radar Facility). Figure 7-66 shows the approximate location of the dump.

7.66.1.7 GENERAL PHYSICAL CONDITIONS

Inactive. The surface of the site is covered with trees and heavy vegetation.

7.66.1.8 CLOSURE METHOD

Unknown.

7.66.2 WASTE CHARACTERISTICS

7.66.2.1 TYPE OF WASTE

The dump was used for the disposal of drums, scrap metal and wood (including appliances, a small propane gas container, a hand-held pump sprayer, wooden pallets, railroad ties, and

wooden and metal fencing), as well as miscellaneous items such as floor tiles and furniture.

Approximately fifty 55-gallon drums are visible in the area. Not all drums have been examined, but most appear to be empty and have visible holes. At least two drums were bulging, but had visible holes. Some were painted white, indicating that they were possibly used by the MWR horse stable for barrel racing. MWR personnel reported that some of the drums were used to spread oil on the horse trails and stable areas. Others may have been used as trash containers. Most were rusted. At least one drum was labeled as once containing solvents.

#### 7.66.2.2 MIGRATION CHARACTERISTICS

Materials in the dump may be carried into and along the ravine during heavy rainfall events. Liquid wastes, if present, could move both downward and horizontally, depending upon the proximity of the ground water table and existing subsurface condition. Any gases released due to container puncture or gases generated during waste decomposition will follow the path of least resistance through the ground or atmosphere.

#### 7.66.2.3 TOXICOLOGICAL CHARACTERISTICS

Refer to section 6.0. To be determined based on further site investigation.

#### 7.66.2.4 PHYSICAL/CHEMICAL CHARACTERISTICS

Substances appear to be inert, but depending on possible contents of the drums and disposal of the material in the dump, heavy metals and organics may be present.

#### 7.66.3 MIGRATION PATHWAYS

##### 7.66.3.1 GEOLOGIC SETTING

Refer to Section 3.0 for geologic setting.

##### 7.66.3.2 HYDROGEOLOGIC SETTING

Monitoring wells on the station indicate a general south to southwesterly ground water flow. Flow is generally toward the Big Creek Drainage Canal located on the NAS Memphis South Side.

##### 7.66.3.3 ATMOSPHERIC CONDITIONS

Refer to Section 4.0 for atmospheric conditions.

#### 7.66.3.4 TOPOGRAPHIC CHARACTERISTICS

Refer to Section 3.1 for general topographic characteristics. The site is located in a ravine approximately 8 feet deep, and overgrown with native vegetation. Objects are visible on the ground surface (along the side of the ravine, and in the bottom of the ravine).

#### 7.66.3.5 PATHWAYS

##### AIR

Due to the nature of the waste presumed to be deposited within the dump, testing of the air is not required.

##### SOIL

Contaminant transport through the soil would most likely occur in a vertical movement beneath the dump, until reaching an aquifer or perched water zone. At that time, contaminant movement would flow with the ground water or other water source.

##### SURFACE WATER/SEDIMENT

Contamination through surface water transport into North Fork Creek Drainage Canal is possible.

##### GROUNDWATER

There is a possibility of contamination of groundwater.

##### SUBSURFACE GAS

Due to the nature of the waste presumed to be deposited within the dump, subsurface gas is unlikely.

#### 7.66.4 CONTAMINANT RELEASE IDENTIFICATION

##### 7.66.4.1 PRIOR INSPECTION REPORTS

A site inspection was conducted on August 8, 1994. No visual evidence of release was observed. No prior inspection reports have been developed.

##### 7.66.4.2 PUBLIC COMPLAINTS

None.

##### 7.66.4.3 MONITORING/SAMPLING

None. No data monitoring/sampling has been conducted.

7.66.4.4 EVIDENCE OF RELEASE

Not found.

7.66.5 EXPOSURE POTENTIAL

7.66.5.1 PROXIMITY TO AFFECTED POPULATION

The nearest residence is more than 1,500 feet.

7.66.5.2 PROXIMITY TO SENSITIVE ENVIRONMENTS

Unknown.

7.66.5.3 LIKELIHOOD OF MIGRATION TO POTENTIAL RECEPTORS

To be determined.

7.66.7 SUMMARIZED DATA GAP

7.66.7.1 SOIL

No soil data available.

7.66.7.3 GROUNDWATER

No groundwater data available.

7.66.7.4 AIR

No air data available.

7.66.7.5 SUBSURFACE GAS

No subsurface gas data available.

7.66.8 RECOMMENDED ACTIONS

As determined by EPA Region IV and Tennessee Department of Environment and Conservation, this SWMU will undergo an Interim Measures removal action, followed by a RCRA Facility Investigation (sampling and analysis) to characterize the site.

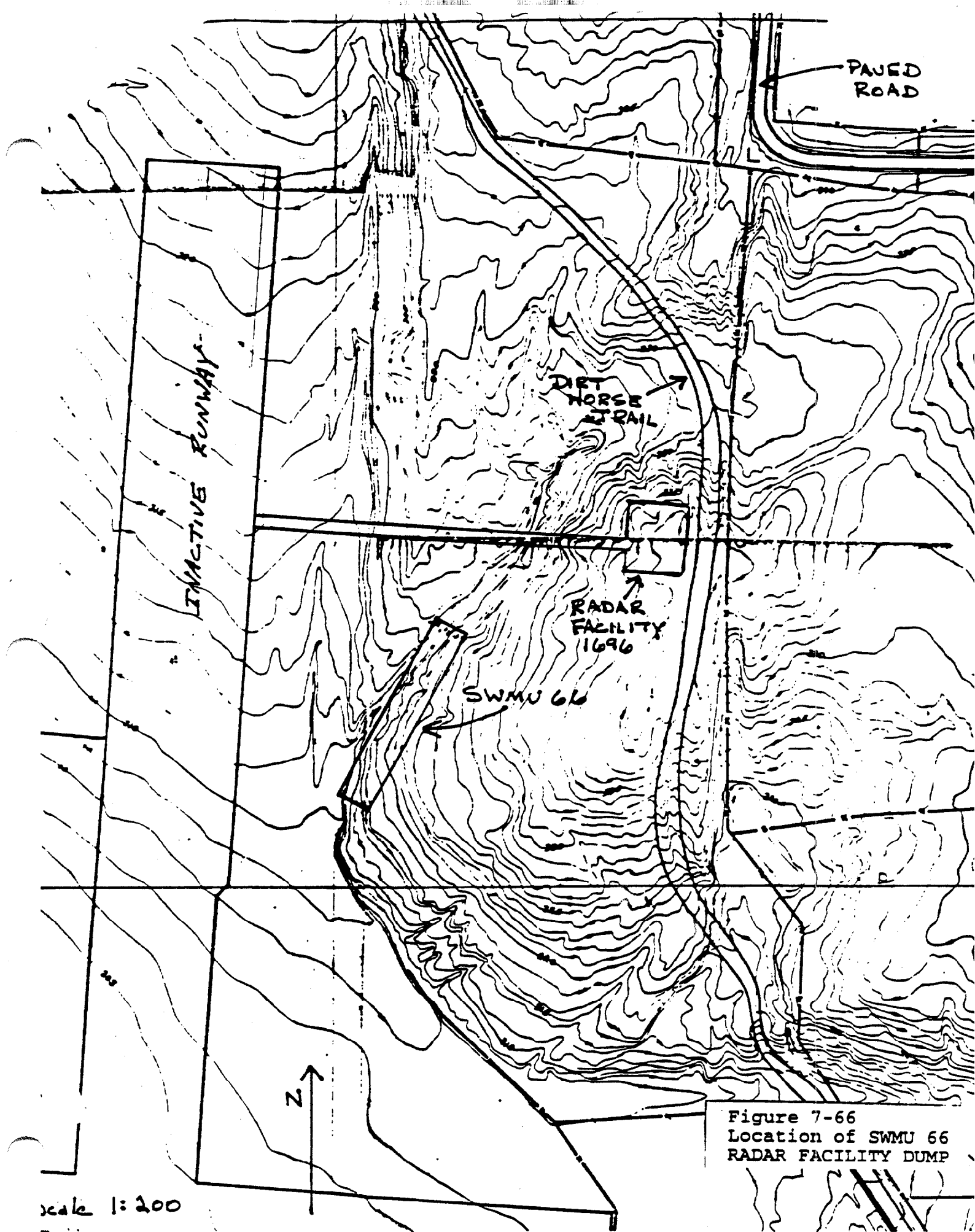


Figure 7-66  
Location of SWMU 66  
RADAR FACILITY DUMP

## **Appendix C**

### **Matrix Identifications/Descriptions**

**Table B-1**  
**Sample Matrix/Descriptions**

<b>Matrix Codes</b>		<b>QA Codes</b>	
<b>S</b>	Soil	<b>T</b>	Trip Blank
<b>C</b>	Soil Duplicate	<b>E</b>	Equipment Rinsate Blank
<b>M</b>	Sediment	<b>D</b>	DI System Blank
<b>N</b>	Sediment Duplicate	<b>P</b>	Potable Water Blank
<b>G</b>	Groundwater	<b>F</b>	Field Blank
<b>H</b>	Groundwater Duplicate	<b>L</b>	Filter Blank
<b>W</b>	Surface Water	<b>B</b>	USEPA Blind Spike
<b>R</b>	Surface Water Duplicate	<b>2</b>	Cement Blank
<b>U</b>	Sludge	<b>3</b>	Drilling Mud Blank
<b>Y</b>	Sludge Duplicate	<b>4</b>	Grout Blank
<b>Z</b>	Liquid Waste	<b>5</b>	Bentonite Blank
<b>V</b>	Solid Waste	<b>6</b>	Sand Blank



## **Appendix D**

### **Site-Specific Health and Safety Plan**

**VOLUNTARY CORRECTIVE ACTION WORK PLAN  
RCRA FACILITY INVESTIGATION  
NAVAL SUPPORT ACTIVITY MEMPHIS**

**SITE-SPECIFIC HEALTH AND SAFETY PLAN  
SWMU 66 — RADAR FACILITY DISPOSAL AREA**

**Revision: 02**

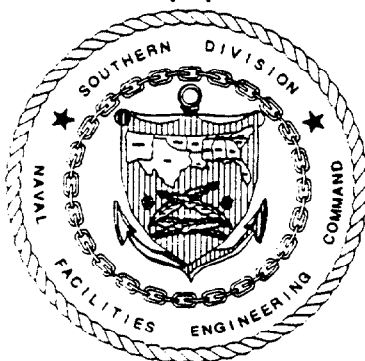
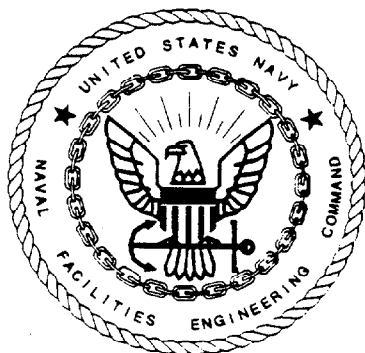
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**February 27, 1996**

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## **1.0 INTRODUCTION**

As part of the U.S. Navy's Comprehensive Long-Term Environmental Action Navy program, EnSafe/ Allen and Hoshall (E/A&H) is implementing the attached Resource Conservation and Recovery Act (RCRA) Interim Measures Work Plan (IMWP) at the Radar Facility Disposal Area (Solid Waste Management Unit [SWMU] 66) at Naval Support Activity (NSA) Memphis in Millington, Tennessee.

This Site-Specific Health and Safety Plan (SSHSP) is to be used in conjunction with the approved NSA Memphis *Comprehensive Health and Safety Plan (CHASP)*. Copies of both this plan and the CHASP should be onsite during all field operations.

### **Applicability**

Current Hazardous Waste Operations and Emergency Response training certificates for E/A&H and its subcontractors to be conducting fieldwork onsite, will be filed onsite and available for review. Individuals whose certifications are not on file, or those who have a more recent certificate (have attended a refresher course), will provide the Onsite Supervisor with copies of their certificates before being allowed to enter a work area.

Current Occupational Safety and Health Administration (OSHA) refresher training certificates will be available onsite for all employees involved in field activities if their refresher course requirements come up for renewal before the project begins. All subcontractors, Department of Defense (DOD) oversight personnel, and any other site visitors must provide health and safety certification with appropriate refresher course documentation prior to site entry.

## **2.0 SITE CHARACTERIZATION**

### **2.1 Site Description**

SWMU 66 is on the NSA Memphis Northside, southwest of the Radar Facility (Building 1696), and east of inactive Runway 18 (Figure 1). The area was identified in July 1994 by the Navy Construction Battalion (Seabees) while clearing trees which were interfering with the operation of the nearby Radar Facility. The area was apparently used by the Morale, Welfare, and Recreation Department as a dump for scrap metal, wood, 55-gallon drums, and miscellaneous debris. The site is a heavily vegetated ravine, approximately 12 feet deep, 50 feet wide, and 350 feet long.

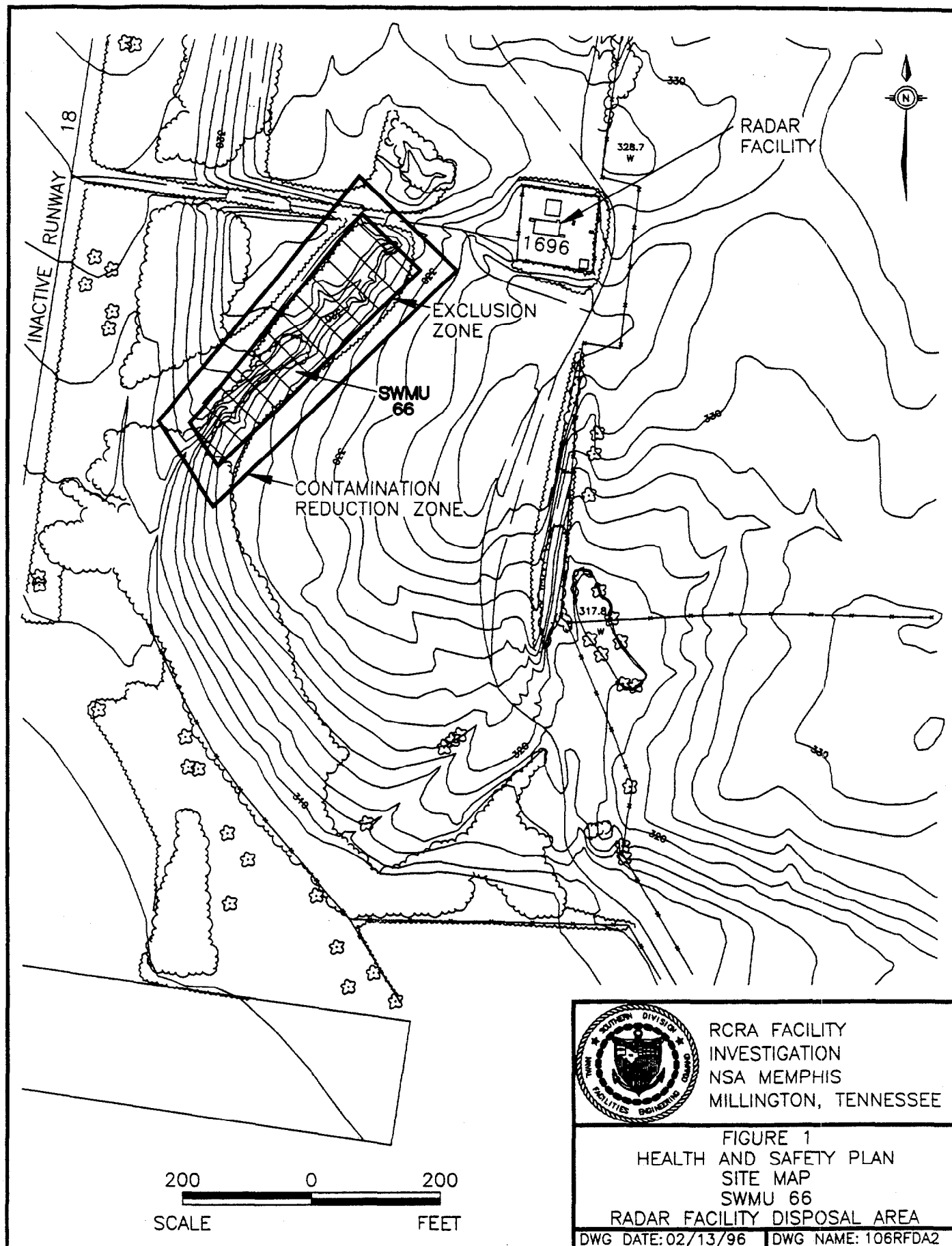
The area surrounding the SWMU is nonindustrial, has some topographic relief, and is covered with grass, shrubs, and trees. The ravine receives runoff from a relatively large area and channels it to the base storm sewer system, which eventually discharges to North Fork Creek.

### **2.2 Work Areas**

See Section 7.1.1 of the CHASP for a description of the following work zones:

- Exclusion Zone (EZ)
- Contaminant Reduction Zone (CRZ), and
- Support Zone (SZ).

For a description of field activities to be conducted at the site and within each work area, see the IMWP.



### **2.3 Work Area Access**

Authorized personnel will be allowed access to work areas as long as they follow the requirements of this SSHSP and the CHASP. See also Work Area Access, Section 7.1.2 of the CHASP.

### **2.4 Site Map and Work Zones**

The location and tentative layout of the site is shown in Figure 1. The actual EZ, CRZ, and SZ locations will be based on physical layout of the site, work task requirements, and current meteorological conditions.

## **3.0 SITE ACTIVITIES**

Site activities conducted by E/A&H will include collecting soil samples as described in the IMWP. The headspace of each drum will be screened using a photoionization detector (PID) and/or appropriate sampling equipment. Drums containing liquids or solids will not be moved. These drums will only be sampled after all dangers have been neutralized. The sampling procedures are described in the *Comprehensive RCRA Facility Investigation Work Plan*.

## **4.0 CHEMICAL HAZARDS**

The chemicals of potential concern (COPCs) identified for this site are based on review of previous investigations. Where the investigations identified specific COPC(s), those chemicals are listed. Material Safety Data Sheets (MSDS) for these substances are included in Attachment A of the CHASP. However, where historical information does not identify the use or disposal of specific COPC(s), only chemical classes are specified. To measure, evaluate, and prevent worker exposures, the procedures outlined in this document will account for all available information and will base control procedures and personal protective equipment (PPE) on worst-case scenario assumptions. Exposure monitoring, controls, and PPE will be based on identified specific chemical hazards. If only chemical a class is known, exposure monitoring, control



procedures, and PPE will be designed to accommodate a wide range of chemicals within that class or classes. E/A&H will approach the site assessment with appropriate caution and with site workers trained and equipped to measure and identify chemical hazards potentially generated during each intrusive procedure. Chemical hazards are selected to represent the range of acute and chronic health (toxicological) hazards that are, or may foreseeably be, present onsite. That is, not every chemical known or suspected of being present is listed as a chemical hazard. Rather, some of the most toxic or most prevalent contaminants within a class of chemicals are listed. To illustrate this principle, listed below are classes of chemicals or chemical categories in one column, and examples of chemical hazards in the second column.

<b>Class of Chemical/Product</b>	<b>Chemical Hazard</b>
• Chlorinated solvents	Perchloroethylene, chloroform, and trichloroethylene
• Degreasers	Methylene chloride and 1,1,1-trichloroethane
• Nonchlorinated solvents	Benzene, toluene, xylene, ethylbenzene, 2-butanone, and hexane
• Metals/heavy metals	Lead, cadmium, chromium (especially hexavalent chrome), mercury, silver, and copper
• Fuels — gasoline, fuel oil,	Benzene, toluene, tetraethyl lead, kerosene, xylene, and diesel, lubricants, oils, and hexane
• Paints	See Solvents and Metals above, plus tributyltin
• Pesticides, chlorinated	DDT, DDE, chlordane, dieldrin, aldrin, disulfoton, BHC, heptachlor, endosulfan, endrin ketone, and methyl parathion

Table 1 lists the specific chemical hazards.

Table 1  
 Exposure Limits for Expected Site Chemical Hazards

Name	Odor <sup>a</sup> Threshold	OSHA PEL <sup>b</sup>	ACGIH TLV <sup>c</sup>	NIOSH REL <sup>d</sup>	Auto- Ignition (°F)	Flammable Range <sup>e</sup> (% by volume)
Lead	N.A.	0.05 mg/m <sup>3</sup>	0.05 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>	N.A.	N.A.
Mercury	N.A.	0.05 mg/m <sup>3</sup> skin	0.05 mg/m <sup>3</sup> skin	0.05 mg/m <sup>3</sup>	N.A.	N.A.
Cadmium	N.A.	0.06 mg/m <sup>3</sup> ceiling	0.05 mg/m <sup>3</sup>	Potential Occupational Carcinogen	N.A.	N.A.
Chromium	N.A.	0.01 mg/m <sup>3</sup>	0.05 mg/m <sup>3</sup>	N.A.	N.A.	N.A.
Copper	N.A.	1 mg/m <sup>3</sup>	1 mg/m <sup>3</sup>	1 mg/m <sup>3</sup>	N.A.	N.A.
Mercury	N.A.	0.1 mg/m <sup>3</sup> ceiling	0.1 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>	N.A.	N.A.
Silver	N.A.	0.01 mg/m <sup>3</sup>	0.01 mg/m <sup>3</sup>	not listed	N.A.	N.A.
Zinc	N.A.	not listed	not listed	not listed	N.A.	N.A.
Toluene	40 ppm	100 ppm 150 ppm- STEL	50 ppm	100 ppm 150 ppm- STEL	996.5	1.1 - 7.1
Ethylbenzene	140 ppm	100 ppm 125 ppm-STEEL	100 ppm 125 ppm-STEEL	N.A.	860	0.8 - 6.7
Benzene	4.68 ppm	1 ppm 5 ppm STEL	0.1 ppm Human Carcinogen	0.1 ppm 1 ppm - STEL Potential Carcinogen	1097	1.2 - 7.8
Xylene	100 ppm	100 ppm 150 ppm-STEEL	100 ppm 150 ppm-STEEL	100 ppm 150 ppm-STEEL	N.A.	0.9 - 7.0
Methylene Chloride	N.A.	50 ppm	50 ppm	N.A.	N.A.	13.0 - 23.0
Acetone	N.A.	750 ppm 1000 ppm- STEL	2375 mg/m <sup>3</sup>	250 ppm	465	2.5 - 12.8
1,1,1- Trichloroethane	N.A.	350 ppm	350 ppm	1000 ppm	N.A.	6.0 - 15.5
Carbon Tetrachloride	N.A.	2 ppm	5 ppm	2 ppm-STEEL	N.A.	N.A.
Trichloroethene	N.A.	50 ppm	50 ppm	25 ppm	N.A.	8 - 10.5
1,1,2- Trichloroethane	N.A.	10 ppm	10 ppm	10 ppm	N.A.	6 - 15.5

Table 1  
Exposure Limits for Expected Site Chemical Hazards

Name	Odor <sup>a</sup> Threshold	OSHA PEL <sup>b</sup>	ACGIH TLV <sup>c</sup>	NIOSH REL <sup>d</sup>	Auto- Ignition (°F)	Flammable Range <sup>e</sup> (% by volume)
2-Hexanone	N.A.	5 ppm	N.A.	5 ppm	N.A.	1.2 - 8.0
Chlorobenzene	N.A.	75 ppm	75 ppm	75 ppm	N.A.	1.3 - 9.6
Phenol	N.A.	5 ppm	5 ppm	5 ppm	N.A.	1.8 - 8.6
Nitrobenzene	N.A.	1 ppm	1 ppm	1 ppm	N.A.	1.8 - ?
Naphthalene	N.A.	10 ppm 15 ppm-STEEL	10 ppm	10 ppm 15 ppm-STEEL	N.A.	0.9 - 5.9
PCBs	N.A.	0.5 mg/m <sup>3</sup> skin	0.5 mg/m <sup>3</sup> skin	0.0001 mg/m <sup>3</sup>	N.A.	N.A.
Heptachlor	N.A.	0.5 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>	N.A.	N.A.
Aldrin	N.A.	0.25 mg/m <sup>3</sup>	0.25 mg/m <sup>3</sup>	0.25 mg/m <sup>3</sup>	N.A.	N.A.
Dieldrin	N.A.	0.25 mg/m <sup>3</sup>	N.A.	0.25 mg/m <sup>3</sup>	N.A.	N.A.
Methoxychlor	N.A.	10 ppm	10 mg/m <sup>3</sup>	N.A.	N.A.	N.A.
Endrin	N.A.	0.1 mg/m <sup>3</sup>	N.A.	0.1 mg/m <sup>3</sup>	N.A.	N.A.
Chlordane	N.A.	0.5 mg/m <sup>3</sup>	N.A.	0.5 mg/m <sup>3</sup>	N.A.	N.A.

**Notes:**

- <sup>a</sup> = Odor Threshold for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Association, 1989.
- <sup>b</sup> = Permissible Exposure Limits (PELs) legal standards enforced by Occupational Safety and Health Administration (OSHA) and found in CFR 1910.1000.
- <sup>c</sup> = Threshold Limit Values, and Short-Term Exposure Limits (TLVs and STELs) are recommended guidelines developed by the American Conference for Governmental Industrial Hygienist (ACGIH).
- <sup>d</sup> = Recommended Exposure Limits (RELs) are non-enforceable guidelines developed by the National Institute for Occupational Safety and Health Administration (NIOSH) to support OSHA.
- <sup>e</sup> = Action Levels based on 50% of lowest exposure limit
- NA = Not Applicable
- mg/m<sup>3</sup> = milligrams per cubic meter
- ppm = parts per million

## **5.0 OPERATIONS AND PHYSICAL HAZARDS**

Physical hazards typically encountered during environmental investigations will be present at this site. These hazards include heat-related illnesses, uneven terrain, slippery surfaces, waterborne operations, lifting, and use of heavy equipment. The Site Supervisor and Site Health and Safety Officer shall be aware of the potential for heat stress and other weather-related illnesses, and as necessary, implement appropriate work regimens to minimize the likelihood of field personnel becoming ill.

Heavy equipment operations will be conducted in accordance with the procedures outlined in Attachment B of the CHASP. When conducting operations or survey work on foot, personnel will walk at all times. Running greatly increases the probability of slipping, tripping, and falling. If working in areas supporting habitat for poisonous snakes, personnel should wear protective chaps made of a heavy material designed to prevent snake bites to the legs.

## **6.0 EMPLOYEE PROTECTION**

Employee protection for this project includes standard safe work practices, NSA Memphis rules of conduct, PPE, personal decontamination procedures, and equipment for extreme weather conditions, work limitations, and exposure evaluation.

### **6.1 Standard Safe Work Practices**

See Section 7.5.1 of the CHASP for Standard Safe Working Practices.

### **6.2 NSA Memphis General Rules of Conduct**

See Section 7.5.2 of the CHASP for NSA Memphis General Rules of Conduct.

### **6.3 Selection of Personal Protective Equipment**

It is important that PPE be appropriate to protect against the potential or known hazards at each cleanup or investigation site. Protective equipment will be selected based on the types, concentrations, and routes of personal exposure that may be encountered. In situations where the types of materials and possibilities of contact are unknown or the hazards are not clearly identifiable, a more subjective determination must be made of the PPE required, based on experiences and sound safety practices.

The Project Health and Safety Officer will determine the appropriate level of PPE prior to the initial site entry based on the best available information. PPE requirements are subject to change as site information is updated or changes. **The decision to upgrade or downgrade levels of PPE shall be made by the Project Health and Safety Officer.**

The initial level of PPE for invasive field activities performed at SWMU 66 is Level B. An invasive field activity is defined as any activity that disturbs potentially impacted materials. Level B consists of the following:

- Poly-coated (Saranex) chemical-resistant coveralls with hood
- Silver Shield inner and nitrile outer gloves
- Chemical-resistant boots with steel toe and steel shank
- Hard hat
- Positive-pressure self-contained breathing apparatus or positive-pressure supplied-air respirator with five-minute escape bottle.

PPE requirements are subject to change as site information is updated or changes. **The PHSO must review or make a decision to deviate from specified levels of PPE as contained in this**

**SHSP.** Table 4-2 of the CHASP presents the levels of PPE which may be employed onsite, and the criteria for upgrading PPE.

The initial level of PPE for noninvasive field activities performed at this sites is Modified Level D.

- Chemical-resistant (Tyvek) coveralls with hood
- Nitrile outer gloves with Silver Shield inner gloves
- Chemical-resistant steel toe and steel shank boots
- Hard hat
- Safety glasses with side shields

The Action Level (AL) for this site is a continuous PID or flame-ionization detector reading of 5 parts per million (ppm) or greater in the breathing zone or more than 50% of the OSHA Permissible Exposure Limit (PEL) or American Conference of Governmental Industrial Hygienist (ACGIH) Threshold Limit Value (TLV), whichever is lower. If this occurs, Level D shall be upgraded to Level C. See Table 7-1 in the Comprehensive Health and Safety Plan for the specific criteria for use and equipment for each level of protection. PPE requirements are subject to change as site information is updated or changes. A decision to deviate from specified levels of PPE as contained in the SHSP must be made or reviewed by the PHSO.

#### **6.4 Air Monitoring**

Previous site investigations indicate that workers may be exposed to low concentrations of chemicals including volatile organic compounds (VOCs), halogenated compounds, and combustible gases/vapors. Based on site history and existing sampling data, worst-case contaminated areas will be identified before field activities begin.

A PID and/or other appropriate sampling equipment will be used to monitor air before field activities begin at a new EZ and during ground-disturbing activities. The PID will be field calibrated to measure VOCs relative to a 100 ppm isobutylene standard. If VOCs are detected downhole, colorimetric detector tubes and/or other sampling media may be used to determine the identification and approximate concentration of these compounds.

A combustible gas indicator (CGI) will be used during all soil borings and well installations. The CGI will be field calibrated to measure flammable gases relative to a 23% lower explosive limit (LEL) methane standard. Downhole CGI readings will be collected continuously during all soil-disturbing operations. Field activities will immediately cease if downhole readings exceed 10% LEL. If CGI readings do not subside, a careful investigation and mapping of the area will be made. Operations may not proceed until readings are below 10% LEL. The area will be immediately evacuated and the situation re-evaluated to determine how to proceed.

If breathing zone concentrations exceed 5 ppm above background or site conditions indicate that additional health and safety precautions are needed, field activities in the area shall stop. Field staff shall notify the Site Supervisor of the situation and he/she shall contact both the Project Manager and the Project Health and Safety Officer. The Project Health and Safety Officer will be responsible for reassessing the hazards and prescribing revised health and safety requirements as necessary, including upgraded PPE requirements, revised work schedules, and revised decontamination procedures. (Typically, PPE will be upgraded to Level C assuming that cartridge respirators are appropriate, otherwise Level B). Work shall not proceed until breathing zone concentrations return to background levels and it is reasonably anticipated that breathing zone samples will stay approximately at background levels, or the chemical constituent(s) are identified and appropriate PPE is donned.

Field monitoring values will be recorded in a field logbook and copies must be posted for field personnel review.

PIDs, CGIs, and other monitoring equipment shall be calibrated daily or their proper function verified before being used. Throughout the day this equipment shall be periodically checked to ensure that it is working properly. A final calibration shall be conducted at the end of the workday, at which time each instrument will be checked to ensure that it is free from surface contamination. Field staff shall note in their field notebooks that they conducted these calibrations and checks and note whether the equipment was functioning properly. When equipment is not functioning properly it should be brought to the attention of the Site Supervisor or Site Health and Safety Officer, who will arrange for repairs and/or replacement of that equipment as needed.

#### **6.5 Procedures and Equipment for Extreme Hot or Cold Weather**

See CHASP Section 7.5.5 of the CHASP for procedures and equipment for extreme hot or cold weather.

#### **Severe Weather Conditions**

All fieldwork shall immediately cease at the first sign of thunder or lightning. Field personnel shall perform emergency personal and equipment decontamination (see Section 6.6) and seek immediate shelter.

#### **6.6 Decontamination**

See Section 7.5.5 of the CHASP for information on decontamination.



## **6.7 Work Limitations**

All site activities will be conducted during daylight only. All personnel scheduled for these activities will have completed initial health and safety training and actual field training as specified in Title 29 Code of Federal Regulations (CFR) 1910.120(e). All supervisors must complete an additional eight-hours of training in site management. All personnel must complete an eight-hour refresher training course annually in order to continue working onsite.

## **7.0 MEDICAL MONITORING PROGRAM**

See CHASP Section 7.6 of the CHASP.

## **8.0 AUTHORIZED PERSONNEL**

Personnel anticipated to be onsite at various times during site activities include:

- Principal-in-Charge — Dr. James Speakman (E/A&H)
- Task Order Manager/Project Manager — Mr. Lawson Anderson (E/A&H)
- Project Health & Safety Officer — Mr. Doug Petty (E/A&H)
- Field Environmental Scientist — Mr. Robert Smith (E/A&H)
- Engineer-in-Charge (EIC) — Mr. Mark Taylor Southern Division (SOUTHDIV)
- Naval Support Activity Memphis, Tennessee Site Contact — Ms. Tonya Barker

### **8.1 Responsibilities of Site Supervisor**

See Section 7.7.1 of the CHASP.

### **8.2 Responsibilities of Site Health and Safety Officer**

See Section 7.7.2 of the CHASP.

### **8.3 Responsibilities of Onsite Field Staff**

See Section 7.7.3 of the CHASP.

### **9.0 EMERGENCY INFORMATION**

All hazardous waste site activities present a risk to onsite personnel. During routine operations risk is minimized by establishing good work practices, staying alert, and using proper PPE. Unpredictable events such as physical injury, chemical exposure, or fire may occur and must be anticipated.

If any situation or unplanned occurrence requires outside or support service, Tonya Barker, NSA Memphis Site Contact, will be informed and the appropriate contact from the following list will be made.

<b>Contact</b>	<b>Agency or Organization</b>	<b>Telephone</b>
Tonya Barker	NSA Memphis	(901) 873-5461/5462
Mark Taylor	SOUTHDIV EIC	(803) 743-0573
Law Enforcement	NSA Memphis Base Security	9-911
Fire Department	NSA Memphis	9-911
Ambulance Service	Naval Hospital, Millington Navy Road	(901) 873-5801/5802 or 9-911
Hospital	Methodist North Hospital 3960 Covington Pike	(901) 372-5211 or 9-911
Southern Poison Control Center	—	(901) 528-6048
Lawson Anderson	EnSafe/Allen & Hoshall	(901) 372-7962

Doug Petty

EnSafe/Allen & Hoshall

(901) 372-7962

Mark Taylor, SOUTHDIV Engineer-in-Charge (EIC) will be contacted after appropriate emergency measures have been initiated onsite.

### **9.1 Site Resources**

Cellular telephones may be used for emergencies and communication/coordination with NSA Memphis. First aid and eye wash equipment will be available at the work area.

### **9.2 Emergency Procedures**

Conditions which may constitute an emergency include any member of the field crew being involved in an accident or experiencing any adverse effects or symptoms of exposure while onsite or if a condition is discovered that suggests the existence of a situation more hazardous than anticipated.

The following emergency procedures should be followed:

- Site work area entrance and exit routes will be planned and emergency escape routes delineated by the Site Health and Safety Officer. Copies of the emergency contacts and routes will be posted onsite.
- If any member of the field team experiences any effects or symptoms of exposure while on the scene, the entire field crew will immediately stop work and act according to the instructions provided by the Site Health and Safety Officer.
- For applicable site activities, wind indicators visible to all onsite personnel will be provided by the Site Health and Safety Officer to indicate possible routes for upwind escape.

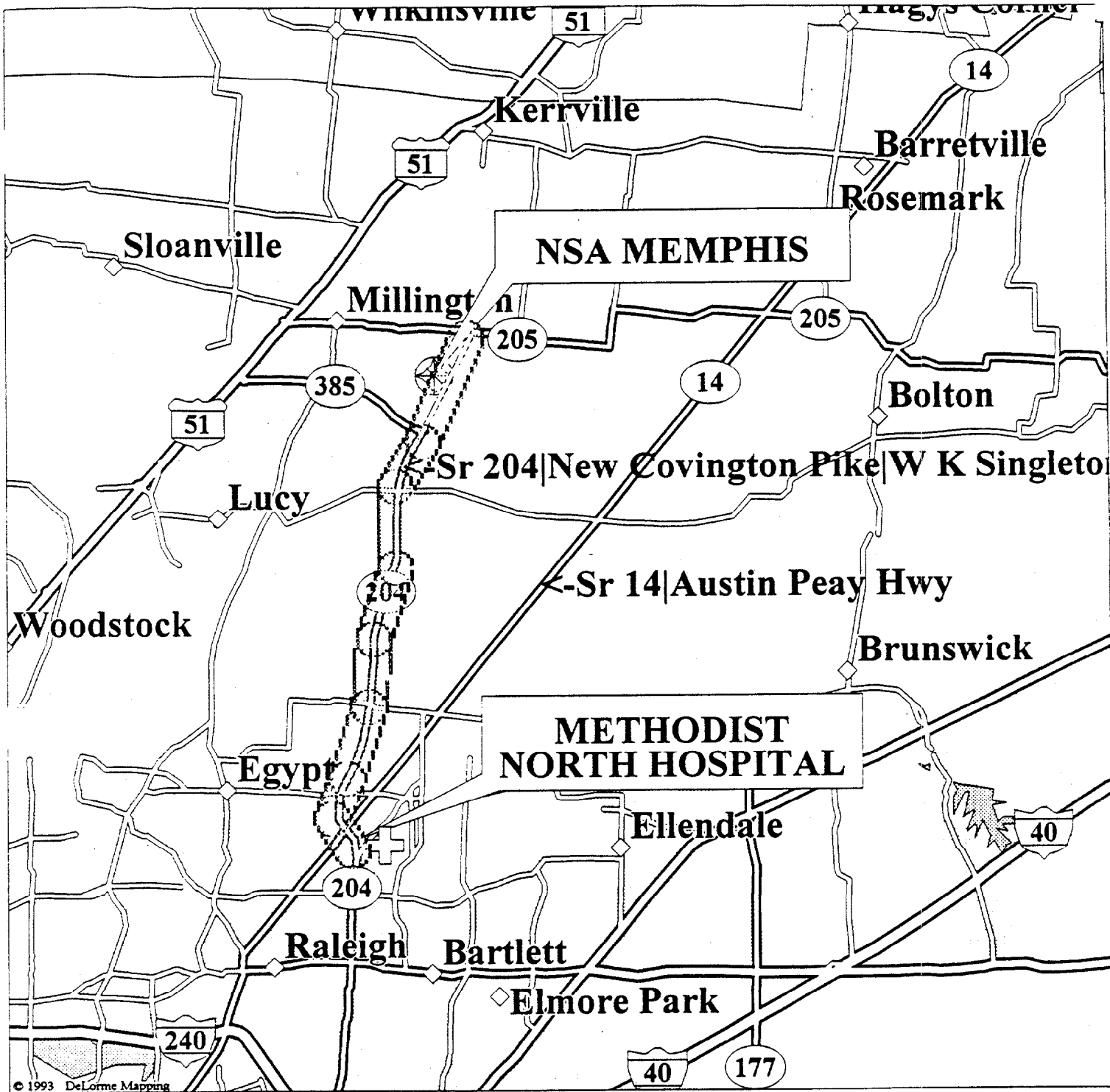
- The discovery of any conditions that would suggest the existence of a situation more hazardous than anticipated will result in the suspension of work until the Site Health and Safety Officer has evaluated the situation and provided the appropriate instructions to the field team.
- If an accident occurs, the Field Project Manager is to complete an Accident Report Form (See Attachment C of CHASP) for submittal to the managing principal-in-charge of the project.
- If a member of the field crew suffers a personal injury, the Site Health and Safety Officer will call (901) 372-5211 or 9-911 (serious injury) to alert appropriate emergency response agencies or administer onsite first aid (minor injury) as the situation dictates. An Accident Report Form will be completed for any such incident.
- If a member of the field crew suffers chemical exposure, the affected areas should be flushed immediately with copious amounts of clean water, and if the situation dictates, the Site Health and Safety Officer should alert appropriate emergency response agencies, or personally ensure that the exposed individual is transported to the nearest medical treatment facility for prompt treatment. (See Attachment A for map to the emergency medical facility.) An Accident Report Form will be completed for any such incident.

Additional information on appropriate chemical exposure treatment methods will be provided through MSDS, which are in the NSA Memphis Field Trailer.

## **10.0 FORMS**

See Attachment C of the CHASP for all Health and Safety Forms.

**Attachment A**  
**Map to Hospital**



#### LEGEND

- Population Center
- State Route
- Town, Small City
- Interstate, Turnpike
- US Highway
- County Boundary
- Major Street/Road
- State Route

- Interstate Highway
- US Highway
- Open Water

Scale 1:125,000 (at center)

2 Miles

2 KM

ROUTE TO METHODIST NORTH HOSPITAL

Mag 11.00

Tue Feb 27 12:34:43 1996